

COMMON TOXIC CHEMICALS AND THEIR HAZARDS

Presented here are the top 15 TRI chemicals in descending order of the amount released to on-site to air, water, and/or land (see Figures 2-4 on pages 7-10). This information is presented as a quick reference summary of information for these toxic chemicals. This is not a detailed source of information on the sources, uses, or hazards of these chemicals. This information was obtained from the Hazardous Substance Fact Sheets provided by the New Jersey Department of Health and distributed by the EPA. The source for this information is listed in the For Further Information section on pages 59-60 of this report. The reader may also consult other chemical or toxicology reference materials to learn more about chemicals of interest. One such source is the Agency For Toxic Substances And Disease Registry. This source has a web site that has extensive information about many of the toxic chemicals in this report at: <http://www.atsdr.cdc.gov/toxpro2.html> as well as a shorter summary that answers many common questions about the chemical at: <http://www.atsdr.cdc.gov/toxfaq.html>. Excerpts for Nitrate Compounds came from EPA The National Nitrate Compliance Initiative, April 2002. Excerpts for metallic compounds came from EPA Risk Burn Guidance for Hazardous Waste Combustion Facilities.

AIR - From Figure 2 on page 7

Hydrochloric Acid (Hydrogen Chloride)

(Aerosol portion only is reportable)

Used in: Metal processing and cleaning, analytical chemistry, and making other chemicals. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Liquid phase can cause skin and eye burns, aerosol phase can irritate the mouth, nose and throat. People working in occupations in which hydrochloric acid gas is being used or manufactured have the highest risk of being exposed. Most families will not be exposed to significant levels of hydrochloric acid gas.

Sulfuric Acid

(Aerosol portion only is reportable)

Used in: Fertilizers, chemicals, dyes, petroleum refining, etching, analytical chemistry, metal manufacturing and plating, and explosives. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Liquid phase can cause skin and eye burns, aerosol phase can irritate the mouth, nose and throat. People working in occupations in which sulfuric acid gas is being used or manufactured have the highest risk of being exposed.

Hydrogen Fluoride

Used in: Etching glass, manufacturing chemicals and gasoline. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Liquid phase can cause skin and eye burns, aerosol phase can irritate the mouth, nose and throat. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. Toxic by inhalation and ingestion or skin absorption.

Carbonyl Sulfide

Used in: Chemical manufacturing, also a by-product of petroleum refining.

Hazard: Can irritate the eyes, nose, and throat and skin, toxic by inhalation and ingestion or skin absorption. High exposure may cause nausea, dizziness, confusion, and vomiting, increased or irregular heartbeat.

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Ammonia

Used in: Refrigerant, in manufacturing fertilizer, plastics, dyes, and textiles. A product of human activity, including natural organic decomposition, run-off from fields and feedlots, waste treatment plant and refinery/chemical manufacturing effluents. Ammonia is applied directly into soil on farm fields, and is used to make fertilizers for farm crops, lawns, and plants. Many household and industrial cleaners contain ammonia.

Hazard: May irritate lungs, eyes, nose, throat, and mouth. Corrosive, can severely damage eyes and cause permanent damage. Not normally a liquid at room temperatures, workplace contact with liquid can freeze skin.

Certain Glycol Ethers

Used in: Solvents, paint thinners.

Hazard: Can irritate the eyes, nose, throat, and skin. Toxic by inhalation and ingestion or skin absorption.

Propylene

Used in: Propylene is used in the production of many organic chemicals including resins, plastics, synthetic rubber and gasoline.

Hazard: Toxic by inhalation. Exposure to high levels can cause you to feel dizzy, lightheaded, and may cause unconsciousness. Boils at a low temperature (-47°C) and is a highly flammable gas. Contact with liquid may cause frostbite. Exposure may damage the liver, and affect the nervous system.

Vinyl Chloride

Used in: Plastics, adhesives and chemical manufacturing.

Hazard: Known carcinogen, mutagen. Toxic by inhalation and ingestion or skin absorption. May cause damage to developing fetus. May damage liver, kidneys, bones, blood vessels, and skin. Exposure may cause you to feel drowsy or lightheaded. Vinyl chloride is not normally found in urban, suburban, or rural air in amounts that are detectable by the usual methods of analysis. You can also be exposed to vinyl chloride in the air through tobacco smoke.

Xylene – Mixed Isomers

Used in: Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

Hazard: Toxic by inhalation and ingestion. Exposure to high levels for short times can irritate the skin, eyes, nose, and throat. Exposure for long periods of time may cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Repeated exposure may cause low blood cell count. No health effects have been noted at the background levels that people are exposed to on a daily basis.

Vinyl Acetate

Used for: Plastics and chemical manufacturing.

Hazard: Inhalation can irritate the eyes, skin, nose, and throat. High levels of exposure can cause dizziness. May damage the lungs. Is a hazardous substance, is flammable and reactive. Is soluble in water and toxic to wildlife.

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1,2,4,-Trimethylbenzene

Used in: Manufacture of dyes, pharmaceuticals, used as a solvent.

Hazard: Toxic when inhaled and by skin contact. Can irritate the nose, throat, and eyes. Contact can irritate the skin. Prolonged contact may cause skin burns, inhalation may cause bronchitis. Repeated exposure may damage the liver and kidneys.

Ethylene

Used in: Polymer, plastic, solvent, resin, and antifreeze production in the petroleum and chemical industries.

Hazard: Exposure is primarily by inhalation in the workplace. Can cause headache, dizziness, and unconsciousness. Skin contact with liquid may cause frostbite. Is flammable, explosive, and reactive.

Methanol

Used in: Solvents, cleaners, production of other chemicals.

Hazard: Toxic when inhaled, ingested, or by skin contact. Exposure may cause blindness, nausea, headaches, vomiting, and dizziness. Flammable and a fire hazard.

Styrene

Used in: Making polystyrene plastics, protective coatings, polyesters, resins, and as a chemical intermediate.

Hazard: Possible carcinogen, mutagen. Toxic by inhalation or skin absorption. Found in some foods, styrene can also be transferred in low levels to food from polystyrene packaging material. Can cause eye, nose, and throat irritation. Repeated exposure may cause concentration and memory problems. Higher levels may cause dizziness. Very high levels of exposure may be fatal or cause brain and liver damage. You can also be exposed to styrene in the air through tobacco smoke.

Toluene

Used in: As a solvent, in making gasoline, chemicals, perfumes, medicines, dyes, explosives, and detergents.

Hazard: Toxic by inhalation and skin exposure. Exposure can irritate the skin nasal membranes, and eyes, and can cause birth defects. May cause headache, dizziness, and in high concentrations, cause you to pass out. Chronic or prolonged exposure may cause liver, kidney, and brain damage. Toluene is a flammable liquid.

WATER – From Figure 3 on page 8 - Chemicals not reported in the Air section above

Nitrate & Nitrite Compounds (Sodium Nitrate, Sodium Nitrite)

Nitrates are toxic chemicals that can pose serious risks to human health and the environment. High levels of nitrates may cause significant environmental damage to streams, lakes, and rivers. Elevated levels of nitrates may damage surface water and ground water with excess nutrients and can cause algae blooms in coastal waters, which can remove oxygen from the water and result in fish kills. High levels can displace oxygen from the bloodstream and produce blue color in the skin and lips. The National Academy of Sciences recently reported that pollution by nitrogen and phosphorous were causing damage in most of the nation's coastal inlets, and severe problems were identified in 44 of the 139 coastal areas examined.

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Manganese and Manganese Compounds *

Used in: Dry-cell batteries, steelmaking, matches, fireworks, in animal feed, fertilizer, livestock nutritional supplements, in glazes and varnishes, and in ceramics, for water purification purposes in water and waste-treatment plants.

Hazard: Toxic when Inhaled. Repeated exposure can cause brain damage, may damage kidneys and liver.

Vanadium Compounds *

Used in: Steel alloys, other vanadium compounds, x-ray equipment, sulfuric acid, and synthetic rubber.

Hazard: Toxic when inhaled. Can irritate skin, nose, throat and lungs.

Barium and Barium Compounds *

Used in: Spark plugs and engine rod bearings, and to remove gas from vacuum tubes and television picture tubes.

Hazard: Toxic when inhaled, may irritate skin, eyes, nose and throat.

Nickel and Nickel Compounds *

Used in: Alloys and electroplating, catalysts, dyes, and textile printing.

Hazard: Carcinogenic. Toxic by inhalation. Eye and skin irritant. Repeated exposure may cause scarring of the lungs and may affect the kidneys.

Copper and Copper Compounds *

Used in: Electrical wiring, plumbing, fungicides, pesticides, electroplating, paint pigments and catalysts.

Hazard: Toxic when inhaled. Can irritate the eyes, nose and throat. May cause a skin allergy. Repeated high exposure to copper may affect the liver.

Hydrogen Cyanide and Cyanide Compounds

Used in: As insecticide for closed spaces, metal electroplating, and metal treatment.

Hazard: Extremely toxic by inhalation. Will depress the central nervous system. Will cause weakness and loss of coordination, headache, nausea, eye and skin irritation, and in higher concentrations will cause death in humans.

Zinc and Zinc Compounds *

Used in: Rustproof coating on iron and steel, making brass alloys, car parts, electroplating, batteries, electrical products, paints, and fungicides.

Hazard: Zinc oxide fumes (released during welding on galvanized metal) are toxic when inhaled. Zinc dust is a skin irritant.

Lead and Lead Compounds *

Used in: Batteries, ammunition, cable covering, ceramic glazes, metal alloys, and solders.

Hazard: Toxic by ingestion. Can cause brain damage, particularly in children. Listed as a possible carcinogen.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing

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Chromium Compounds *

Used in: Stainless and alloy steels, refractory products, tanning agents for leather, pigments, electroplating, catalysts, and corrosion-resistant products.

Hazard: Irritant and corrosive to human tissue, chromium compounds are carcinogens. Hexavalent compounds are more toxic than trivalent compounds.

Cresol (Mixed Isomers)

Used in: Making synthetic resins, photographic developers, disinfectants and fumigants.

Hazard: Toxic by inhalation or skin exposure. Corrosive, will cause skin and eye burns, possibly blindness. Soluble in water, toxic fish life. Is on the hazardous substances list.

Ethylene Glycol –

Used in: A component in anti-freeze in heating and cooling systems, to de-ice aircraft, as an industrial solvent, and in paint and plastics.

Hazard: Exposure may irritate nasal passages, cause nausea, vomiting, headache, or an intoxicated feeling. Prolonged exposure may affect the kidneys or brain.

Phenol

Used in: Making plywood, pharmaceuticals, plastics, and rubber. Common product of refinery wastes.

Hazard: Toxic by inhalation or skin exposure. Mutagen; can cause genetic changes, will cause skin and eye burns, possibly permanent eye damage. Soluble in water, toxic to fish life. Is on hazardous substances list.

LAND – From Figure 4 on page 10 - Chemicals not reported in the Air and/or Water sections above

Creosote Compounds

Used in: Wood preservation and water protection for products like railroad ties and utility poles, and for roofing products.

Hazard: By inhalation and skin contact. Listed as a probable carcinogen. Skin contact may cause irritation, burning, and itching, made worse by exposure to sunlight. Contact with eyes will cause severe eye irritation with possible loss of vision.

Polycyclic Aromatic Compounds (PACs)

Used in: Limited use, but a few of these compounds are used in manufacture of dyes, plastics, and pesticides.

Hazard: By inhalation and eating foods containing PACs. Inhalation hazard is from breathing air in areas where substances like coal, oil, and garbage are not burned completely, and in vicinity of agricultural burns and coal-tar and asphalt production facilities. Ingestion hazard is from eating foods such as charred meats, or drinking contaminated water or milk, which may contain PACs. Listed as a probable carcinogen.

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Mercury and Mercury Compounds *

Used in: Thermometers, barometers, vapor lamps, mirror coatings, and in making chemicals and electrical equipment.

Hazard: The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury may permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Benzo(g,h,i)perylene

Used in: Research; can also be used in manufacture of dyes, plastics pesticides, explosives, and drugs.

Hazard: By inhalation, skin contact, and ingestion. Created when substances like coal, oil, and garbage are not burned completely. Can spread to kidneys, fat tissues, and the liver. Naturally eliminated by the body within a few days. Not known to cause cancer in humans.

Dioxin and Dioxin-like Compounds

Chlorinated Dibenzo-p-dioxins (CDDs) are a family of 75 different compounds commonly referred to as polychlorinated dioxins. These compounds have varying harmful effects, and are considered to be very toxic. Seventeen of the dioxin and dioxin-like compounds are reportable to TRI.

Used in: CDDs are not intentionally manufactured by industry, except in small amounts for research purposes. They are naturally produced from the incomplete combustion of organic material by forest fires or volcanic activity. They are unintentionally produced by industrial, municipal, and domestic incineration and combustion processes. CDDs formed during combustion processes are associated with small particles in the air, such as ash. The larger particles will be deposited close to the emission source, while very small particles may be transported longer distances. Some CDDs may vaporize and be transported long distances in the atmosphere, even around the globe. CDDs are found everywhere in the environment, and most people are exposed to very small background levels of CDDs when they breathe air or consume food. The most common way CDDs can enter your body is by eating food contaminated with CDDs. CDDs deposited on land from combustion sources or from herbicide or pesticide applications bind strongly to the soil, and therefore are not likely to contaminate groundwater by moving deeper into the soil.

Hazard: The most noted effect in people exposed to large amounts of one CCD, 2,3,7,8-TCCD, is chloracne, a severe skin disease. Other skin effects, including rashes and skin discoloration have also been noted. Changes in urine and blood that indicate liver damage may have occurred were also noted.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing.